Claims

[c1]   1.A system for loading an executable code into a downhole tool string component, comprising:

a surface control unit comprising the executable code;

the downhole tool string component comprising volatile memory;

a downhole network comprising data transmission elements integrated into the downhole tool string in communication with the surface control unit and the volatile memory;

wherein the executable code is transmitted from the surface control unit and stored in the volatile memory.

[c2]   2.The system of claim 1 wherein the downhole tool string component further comprises boot memory.

[c3]   3.The system of claim 1 wherein the executable code is selected from the group consisting of software, operating systems, portions of operating systems, calibration constants, data files, and instruction sets.

[c4]   4.The system of claim 1 wherein the volatile memory comprises random access memory (RAM).

[c5]   5. The system of claim 1 wherein the volatile memory comprises a single port.

[c6]   6. The system of claim 1 wherein the volatile memory comprises a dual port.

[c7]   7. The system of claim 1 wherein the downhole tool string component is selected from the group consisting of sensors, motors, jars, seismic sources, seismic receivers, steering elements, hammers, and repeaters.

[c8]   8. The system of claim 1 wherein the downhole tool string component comprises a network interface modem.

[c9]   9. The system of claim 1 wherein the downhole tool string component is associated with a network interface modem associated with a node in the integrated downhole network.

[c10]   10. The system of claim 1 wherein the surface control unit is selected from the group consisting of connections to a local area network, computers, and non-volatile memories.

[c11]   11. The system of claim 1 where in the surface control unit comprises a network interface modem.

[c12]   12. The system of claim 1 wherein the surface control unit comprises a non-volatile memory associated with a

hard drive.

[c13]   13. The system of claim 1 wherein the surface control unit comprises volatile memory.

[c14]   14. The system of claim 1 wherein the surface control unit comprises volatile memory associated with a removable medium.

[c15]   15. The system of claim 1 wherein the downhole network is capable of transmitting data faster than 20 kilobits per second.

[c16]   16. The system of claim 1 wherein the downhole network is capable of transmitting data faster than 1 megabit per second.

[c17]   17. The system of claim 1 wherein the downhole network is capable of transmitting data faster than 10 megabits per second.

[c18]   18. The system of claim 1 wherein the downhole network comprises at one electrical pathway.

[c19]   19. The system of claim 1 wherein the data transmission elements comprise a magnetically-conducting electrically-insulating material.

[c20]   20. The system of claim 19 wherein the magnetically-con-

ducting electrically-insulating material is ferrite.

[c21]   21.The system of claim 1 wherein the data transmission elements comprise a direct electrical contact.

[c22]   22.The system of claim 1 wherein the downhole network is capable of transmitting power signals.

[c23]   23.A method for loading an executable code to a volatile memory in a downhole tool string component comprising:
sending the executable code from a surface control unit to a processor over an integrated downhole network; and writing by a central processing unit the executable code into the volatile memory;
wherein the executable code is volatilely stored in the downhole tool string component.

[c24]   24.The method of claim 23 further comprising the step of reading by the processor from boot memory to retrieve an executable code from the surface control unit.

[c25]   25. The method of claim 23 further comprising the step of requesting by the processor the executable code from the surface control unit over the integrated downhole network.

[c26]   26.The method of claim 23 further comprising the step

of sending a command to the central processing unit as soon as the processor is in electrical communication with the surface control unit.

[c27] 27. The method of claim 23 further comprising the step of directing the executable code sent from surface control unit to the downhole tool string component by network interface modems associated with nodes in the integrated downhole network.

[c28] 28. The method of claim 23 wherein the method further comprises the step of selecting the executable code from the group consisting of software, operating systems, portions of operating systems, calibration constants, data files, and instruction sets.

[c29] 29. The method of claim 23 wherein the volatile memory comprises random access memory (RAM).

[c30] 30. The method of claim 23 wherein the surface control unit comprises non-volatile memory.

[c31] 31. The method of claim 23 wherein the surface control unit comprises volatile memory.

[c32] 32. The method of claim 23 wherein the surface control unit is associated with a network interface modem.

[c33] 33. A method for loading executable code to volatile

memory in at least one processor in at least one down-
hole tool located in a downhole tool string comprising:

providing a processor reading from boot memory to re-
trieve an executable code from a surface control unit;

requesting the executable code from the surface control
unit over an integrated downhole network;

sending the executable code to the processor over the
integrated downhole network; and

temporarily writing the executable code into the random
access memory.

[c34]   34. The method of claim 33 further comprising the step
of directing the executable code sent from the surface
control unit to the correct downhole tool by network in-
terface modems associated with nodes in the integrated
downhole network.

[c35]   35.The method of claim 33 wherein the step of directing
the executable code comprises providing a connection
from to a local area network.

[c36]   36.The method of claim 33 wherein the surface control
unit comprises non-volatile memory.

[c37]   37.The method of claim 33 wherein the surface control
unit comprises volatile memory.